## TITLE INDEX TO VOLUME 29 – 1993


Application of Geographic Information Systems to Groundwater Monitoring Network Design
– *Paul F. Hudak, Hugo A. Loaiciga, and F. Andrew Schoolmaster* ..... 383

Application of Modern Organizational Concepts to a Large Water Resource Study
– *Richard C. Albert* ..... 77

Applications of a GIS for Modeling the Sensitivity of Water Resources to Alterations in Climate in the Gunnison River Basin, Colorado
– *William A. Battaglin, Lauren E. Hay, Randolph S. Parker, and George H. Leavesley* ..... 1021

Automated Extraction of Drainage Network and Watershed Data from Digital Elevation Models
– *Lawrence W. Martz and Jurgen Garbrecht* ..... 901

Central Nebraska River Basins, Nebraska
– *Thomas L. Huntzinger and Michael J. Ellis* ..... 533

Changing Water Balance Over Time in Rush Creek, Eastern California, 1860-1992
– *G. Mathias Kondolf and Peter Vorster* ..... 823

Chaparral Control in Mosaic Pattern Increased Streamflow and Mitigated Nitrate Loss in Arizona
– *Edwin A. Davis* ..... 391

Classification of Environmental Hydrologic Behaviors in the Northeastern United States
– *Kyehyun Kim and Richard H. Hawkins* ..... 449

Comparative Evaluation of Frequency Distributions for Louisiana Extreme Rainfall
– *Babak Naghavi, Fang Xin Yu, and Vijay P. Singh* ..... 211

Determination of Hydraulic Conductivity Tensor Using a Nonlinear Least Squares Estimator
– *M. Heidari and P. C. Heigold* ..... 415

Developing a Field Component in Hydrologic Education
– *Lee H. MacDonald* ..... 357

The Development and Implementation of a GIS-Based Contaminant Source Inventory Over the Spokane Aquifer, Spokane County, Washington
– *Beatrice B. Lackaff, Bruce J. Hunt, and Ian E. Von Essen* ..... 949

The Development of the Nile Hydrometeorological Forecast System
– *Curtis B. Barrett* ..... 933

Development of a Water Supply Protection Model in a GIS
– *Axel J. Griner* ..... 965

Development of Watershed Models for Two Sierra Nevada Basins Using a Geographic Information System
– *Anne E. Jeton and J. LaRue Smith* ..... 923

Economic Evaluation of Aesthetic Amenities: A Case Study of River View
– *S. N. Kulshreshtha and J. A. Gillies* ..... 257

Effect of Simulated Climate Change on Snowmelt Runoff Modeling in Selected Basins
– *V. F. van Katwijk, A. Rango, and A. E. Childress* ..... 755

Effects of Agricultural Nutrient Management on Nitrogen Fate and Transport in Lancaster County, Pennsylvania
– *David W. Hall and Dennis W. Risser* ..... 55

Effects of Climate Change on Water Resources in the Delaware River Basin
– *David M. Wolock, Gregory J. McCabe, Jr., Gary D. Tasker, and Marshall E. Moss* ..... 475

Effects of the Topographic Index Distribution on Predicted Runoff Using GRASS
– *Sihem Chairat and Jacques W. Delleur* ..... 1029

Evaluation of Great Lakes Net Basin Supply Forecasts
– *Thomas E. Croley II and Deborah H. Lee* ..... 267

The Farm Level Effectiveness of Selected Irrigation Policy Measures
– *W. J. Brown, R. G. Roy, and S. N. Kulshreshtha* ..... 169

Forest Practices as Nonpoint Sources of Pollution in North America
– *Dan Binkley and Thomas C. Brown* ..... 729

Geographic Information System Based Nonpoint Pollution Modeling
– *Kurt J. Robinson and Robert M. Ragan* ..... 1003

Hydrologic Modeling with Remotely Sensed Databases
– *J. F. Cruise and R. L. Miller* ..... 997

The Influence of $(x,y)$ Uncertainty on Prediction Error and Contour Lines from a Three-Dimensional Surface
– *James E. Mitchell* ..... 863

Integrating Geographic Information Systems in Ground-Water Applications Using Numerical Modeling Techniques
– *Honesto Roaza, Ruth Montgomery Roaza, and Jeffry R. Wagner* ..... 981

Integrating Geographic Information Systems and MODFLOW for Ground Water Resource Assessments
– *Christopher J. Richards, Honesto Roaza, and Ruth Montgomery Roaza* ..... 847

Integration of Geographic Information Systems and a Computer Model to Evaluate Impacts of Agricultural Runoff on Water Quality
– *Chansheng He, James F. Riggs, and Yung-Tsung Kang* ..... 891

An Introduction to the U.S. Geological Survey's National Water-Quality Assessment Program
– *P. Patrick Leahy, Barbara J. Ryan, and A. Ivan Johnson* ..... 529

LAKEMAP: A 2-D and 3-D Mapping System for Visualizing Water Quality Data in Lakes
– *William B. Samuels* ..... 917

Discussion – "Landsat Mid-Infrared Data and GIS in Regional Surface Soil-Moisture Assessment," by Sun F. Shih and Jonathan D. Jordan
– *David L. Verbyla* ..... 309

Reply – "Landsat Mid-Infrared Data and GIS in Regional Surface Soil-Moisture Assessment," by David L. Verbyla
– *Sun F. Shih and Jonathan D. Jordan* ..... 313

Laws and Programs for Controlling Nonpoint Source Pollution in Forest Areas
– *Thomas C. Brown, Douglas Brown, and Dan Binkley* ..... 1

Management and Analysis of Water-Use Data Using a Geographic Information System
– *Kyle E. Juracek and Joan F. Kenny* ..... 973

A Mathematical Model of Salmonid Spawning Habitat
– *Robert N. Havis, Carlos V. Alonso, John G. King, and Russell F. Thurow* ..... 435

Maximizing the Value of Information for Ground Water Protection: Three Test Cases
– *Dina E. Flockhart, Chi Ho Sham, and Yan Xiao* ..... 957

Measuring Evaporation with Ceramic Bellani Plate Atmometers
– *Thomas A. Fontaine and Don E. Todd, Jr.* ..... 785

Modeling Urban Nonpoint Source Pollution with a Geographic Information System
– *Stephen J. Ventura and Kyehyun Kim* ..... 189

Modeling Water Balance with the ERHYM Model on South Texas Rangelands
– *Mark A. Weltz and Wilbert H. Blackburn* ..... 461

Network and Subwatershed Parameters Extracted from Digital Elevation Models: The Bills Creek Experience
– *Jurgen Garbrecht and Lawrence W. Martz* ..... 909

Open Channel Interpolation of Cross Sectional Properties
– *Robert G. Traver and Arthur C. Miller* ..... 767

The Opportunity Cost of Time and Averting Expenditures for Safe Drinking Water
– *Andrew S. Laughland, Lynn M. Musser, Wesley N. Musser, and James S. Shortle* ..... 291

Optimal Long-Term Scheduling of Stormwater Drainage Rehabilitation
– *Timothy L. Jacobs, Miguel A. Medina, Jr., Neil Kaufman, and David M. Wood* ..... 47

Parameter Estimates for a Ground Water Model
– *M. R. Condon, R. G. Traver, W. B. Fergusson, and R. A. Chadderton* ..... 95

A Practical Model Integrating Quality Assurance Into Environmental Monitoring
– *Malcolm J. R. Clark and Paul H. Whitfield* ..... 119

Precipitation Measurement Biases in the United States
– *David R. Legates and Tracy L. DeLiberty* ..... 855

Predicting Wilderness Snow Water Equivalent With Nonwilderness Snow Sensors
– *Bruce J. McGurk, Thaddeus J. Edens, and David L. Azuma* ..... 85

Preliminary Observations on Water Quality of Storm Runoff from Four Selected Residential Roofs
– *Mingteh Chang and Christopher M. Crowley* ..... 777

Probabilistic Great Lakes Hydrology Outlooks
– *Thomas E. Croley II* ..... 741

Quality Assurance Techniques for Electronic Data Acquisition
– *Paul H. Whitfield and Norman L. Wade* ..... 301

Red River of the North Basin, Minnesota, North Dakota, and South Dakota
– *Jeffrey D. Stoner, David L. Lorenz, Gregg J. Wiche, and Robert M. Goldstein* .....575

Regional and Temporal Patterns of Total Solutes in the Saskatchewan River Basin
– *Barry R. Taylor and Hal R. Hamilton* .....221

Relating Trends of Principal Components to Trends of Water-Quality Constituents
– *Yun-Sheng Yu and Shimin Zou* .....797

Reservoir Sedimentation Rates Linked to Long-Term Changes in Agricultural Land Use
– *Sherwood C. McIntyre* .....487

A Review of Application Issues of the Metropolitan Water District-Main Water Forecasting System
– *James G. Thompson, Michael Parker, William Templin, and Robert R. Reynolds, Jr.* .....425

Rio Grande Valley, Colorado, New Mexico, and Texas
– *Sherman R. Ellis, Gary W. Levings, Lisa F. Carter, Steven F. Richey, and Mary Jo Radell* .....617

Rural Household Response to Water Contamination in West Virginia
– *Alan R. Collins and Scott Steinback* .....199

Sediment Rating Curves for a Clearcut Ponderosa Pine Watershed in Northern Arizona
– *Vicente L. Lopes and Peter F. Ffolliott* .....369

Simulation and Mapping of Soil-Water Conditions in the Great Plains
– *Ronald B. Zelt and Jack T. Dugan* .....939

Sludge Application Effects on Runoff, Infiltration, and Water Quality
– *A. C. Bruggeman and S. Mostaghimi* .....15

South Platte River Basin – Colorado, Nebraska, and Wyoming
– *Kevin F. Dennehy, David W. Litke, Cathy M. Tate, and Janet S. Heiny* .....647

Spatial Analysis for Monthly Rainfall in South Florida
– *W. Abtew, J. Obeysekera, and G. Shih* .....179

Stream Temperature Estimation From Air Temperature
– *Heinz G. Stefan and Eric B. Preud'homme* .....27

Substate Institutional Innovation for Managing Lakes and Watersheds: A Wisconsin Case Study
– *Liane Nakamura and Stephen M. Born* .....807

Summary of Modifications of the U.S. Geological Survey Modular, Finite-Difference, Ground-Water Flow Model to Read and Write Geographic Information System Files
– *Leonard L. Orzol and Timothy S. McGrath* .....843

Temporary Water Transfers for Dry-Year Water Supply
– *John R. Clark and Steven R. Abt* .....249

Tide Gate Influences on a Tidal Marsh
– *Leonard G. Pearlstine, Wiley M. Kitchens, Pamela J. Latham, and Richard D. Bartleson* .....1009

Total Solutes Loads and Geochemical Yields in the Saskatchewan River Basin
– *Barry R. Taylor, Hal R. Hamilton, and Gordon Macdonald* ..... 235

Trinity River Basin, Texas
– *Randy L. Ulery, Peter C. Van Metre, and Allison S. Crossfield* ..... 685

Use of a Geographic Information System to Assemble Input-Data Sets for a Finite-Difference Model of Ground-Water Flow
– *Kurt C. Hinaman* ..... 401

Use of a Hydrologic Model in a Basin-Wide Water Allocation Proceeding
– *Larry S. Dolan and Denise K. DeLuca* ..... 107

Using a Geographic Information System to Determine the Relation Between Stream Quality and Geology in the Roberts Creek Watershed, Clayton County, Iowa
– *S. J. Kalkhoff* ..... 989

Utilization of a Geographic Information System to Identify the Primary Aquifer Providing Ground Water to Individual Wells in Eastern Arkansas
– *Nancy T. Baker* ..... 445

Validation of AGNPS for Small Watersheds Using an Integrated AGNPS/GIS System
– *J. K. Mitchell, B. A. Engel, R. Srinivasan, and S. S. Y. Wang* ..... 833

Variations in Northern Sierra Nevada Streamflow: Implications of Climate Change
– *Alex Pupacko* ..... 283

Discussion – "Ventura River Flood of February 1992: A Lesson Ignored?" by Edward A. Keller and Mark H. Capelli
– *Rudolf E. Ohlemutz* ..... 871

Reply – "Ventura River Flood of February 1992: A Lesson Ignored?" by Rudolf E. Ohlemutz
– *Edward A. Keller and Mark H. Capelli* ..... 873

The Vrana Lake Hydrology (Island of Cres – Croatia)
– *Ognjen Bonacci* ..... 407

# AUTHOR INDEX TO VOLUME 29 – 1993


Abt, Steven R. ....249
Abtew, W. ....179
Albert, Richard C. ....77
Alonso, Carlos V. ....435
Azuma, David L. ....85

Baker, Nancy T. ....445
Barrett, Curtis B. ....933
Bartleson, Richard D. ....1009
Battaglin, William A. ....1021
Binkley, Dan ....1, 729
Blackburn, Wilbert H. ....461
Bonacci, Ognjen ....407
Born, Stephen M. ....807
Brown, Douglas ....1
Brown, Thomas C. ....1, 729
Brown, W. J. ....169
Bruggeman, A. C. ....15

Capelli, Mark H. ....873
Carter, Lisa F. ....617
Chadderton, R. A. ....95
Chairat, Sihem ....1029
Chang, Mingteh ....777
Childress, A. E. ....755
Clark, John R. ....249
Clark, Malcolm J. R. ....119
Collins, Alan R. ....199
Condon, M. R. ....95
Croley II, Thomas E. ....267, 741
Crossfield, Allison S. ....685
Crowley, Christopher M. ....777
Cruise, J. F. ....997

Davis, Edwin A. ....391
DeLiberty, Tracy L. ....855
Delleur, Jacques W. ....1029
DeLuca, Denise K. ....107
Dennehy, Kevin F. ....647
Dolan, Larry S. ....107
Dugan, Jack T. ....939

Edens, Thaddeus J. ....85
Ellis, Michael J. ....533
Ellis, Sherman R. ....617
Engel, B. A. ....833

Fergusson, W. B. ....95
Ffolliott, Peter F. ....369
Flockhart, Dina E. ....957
Fontaine, Thomas A. ....785

Garbrecht, Jurgen ....901, 909
Gillies, J. A. ....257
Goldstein, Robert M. ....575
Griner, Axel J. ....965

Hall, David W. ....55
Hamilton, Hal R. ....221, 235
Havis, Robert N. ....435
Hawkins, Richard H. ....449
Hay, Lauren E. ....1021
He, Chansheng ....891
Heidari, M. ....415
Heigold, P. C. ....415
Heiny, Janet S. ....647
Hinaman, Kurt C. ....401
Hudak, Paul F. ....383
Hunt, Bruce J. ....949
Huntzinger, Thomas L. ....533

Jacobs, Timothy L. ....47
Jeton, Anne E. ....923
Johnson, A. Ivan ....529
Jordan, Jonathan D. ....313
Juracek, Kyle E. ....973

Kalkhoff, S. J. ....989
Kang, Yung-Tsung ....891
Kaufman, Neil ....47
Keller, Edward A. ....873
Kenny, Joan F. ....973
Kim, Kyehyun ....189, 449
King, John G. ....435
Kitchens, Wiley M. ....1009
Kondolf, G. Mathias ....823
Kulshreshtha, S. N. ....169, 257

Lackaff, Beatrice B. ....949
Latham, Pamela J. ....1009
Laughland, Andrew S. ....291
Leahy, P. Patrick ....529
Leavesley, George H. ....1021
Lee, Deborah H. ....267
Legates, David R. ....855
Levings, Gary W. ....617
Litke, David W. ....647
Loaiciga, Hugo A. ....383
Lopes, Vicente L. ....369
Lorenz, David L. ....575

MacDonald, Lee H. ....357
Macdonald, Gordon ....235

Martz, Lawrence W. ..... 901, 909
McCabe, Jr., Gregory J. ..... 475
McGrath, Timothy S. ..... 843
McGurk, Bruce J. ..... 85
McIntyre, Sherwood C. ..... 487
Medina, Jr., Miguel A. ..... 47
Miller, Arthur C. ..... 767
Miller, R. L. ..... 997
Mitchell, J. K. ..... 833
Mitchell, James E. ..... 863
Moss, Marshall E. ..... 475
Mostaghimi, S. ..... 15
Musser, Lynn M. ..... 291
Musser, Wesley N. ..... 291

Naghavi, Babak ..... 211
Nakamura, Liane ..... 807

Obeysekera, J. ..... 179
Ohlemutz, Rudolf E. ..... 871
Orzol, Leonard L. ..... 843

Parker, Michael ..... 425
Parker, Randolph S. ..... 1021
Pearlstine, Leonard G. ..... 1009
Preud'homme, Eric B. ..... 27
Pupacko, Alex ..... 283

Radell, Mary Jo ..... 617
Ragan, Robert M. ..... 1003
Rango, A. ..... 755
Reynolds, Jr., Robert R. ..... 425
Richards, Christopher J. ..... 847
Richey, Steven F. ..... 617
Riggs, James F. ..... 891
Risser, Dennis W. ..... 55
Roaza, Honesto ..... 847, 981
Roaza, Ruth Montgomery ..... 847, 981
Robinson, Kurt J. ..... 1003
Roy, R. G. ..... 169
Ryan, Barbara J. ..... 529

Samuels, William B. ..... 917
Schoolmaster, F. Andrew ..... 383
Sham, Chi Ho ..... 957
Shih, Sun F. ..... 313
Shih, G. ..... 179
Shortle, James S. ..... 291
Singh, Vijay P. ..... 211
Smith, J. LaRue ..... 923
Srinivasan, R. ..... 833
Stefan, Heinz G. ..... 27
Steinback, Scott ..... 199
Stoner, Jeffrey D. ..... 575

Tasker, Gary D. ..... 475
Tate, Cathy M. ..... 647
Taylor, Barry R. ..... 221, 235
Templin, William ..... 425
Thompson, James G. ..... 425
Thurow, Russell F. ..... 435
Todd, Jr., Todd E. ..... 785
Traver, Robert G. ..... 95, 767

Ulery, Randy L. ..... 685

van Katwijk, V.F. ..... 755
Van Metre, Peter C. ..... 685
Ventura, Stephen J. ..... 189
Verbyla, David L. ..... 309
Von Essen, Ian E. ..... 949
Vorster, Peter ..... 823

Wade, Norman L. ..... 301
Wagner, Jeffry R. ..... 981
Wang, S. S. Y. ..... 833
Weltz, Mark A. ..... 461
Whitfield, Paul H. ..... 119, 301
Wiche, Gregg J. ..... 575
Wolock, David M. ..... 475
Wood, David M. ..... 47

Xiao, Yan ..... 957

Yu, Fang Xin ..... 211
Yu, Yun-Sheng ..... 797

Zelt, Ronald B. ..... 939
Zou, Shimin ..... 797